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BIRD MOVEMENTS IN THE WHEATBELT OF WESTERN AUSTRALIA

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The problem of South-western bird movements is one of great complexity and is one that can only be resolved by the accumulation of a large amount of data by a number of observers over a wide field. I propose, however, to advance a few hypotheses which I have formed as a result of observations made in the area commonly known as the Wheat-belt.

This Wheat-belt coincides roughly with the 10-25 inch rainfall region of the South-west and shows considerable uniformity in climate and vegetation.

Most of my observations have been made at Nangeenan, 140 miles in an easterly direction from Perth; Bilbarin, 120 miles also in an easterly direction from Perth, but south of Nangeenan; and Caron, 170 miles in a northerly direction from Perth. All are typical Wheat-belt localities.

The following notes on species that appear to be non-resident are necessarily incomplete but attempt to summarise for the species, while in the South-west, the following information:—

- (a) Period of occurrence.
- (b) Degree of dependence upon water.
- (c) Plant or animal associations.
- (d) Breeding status.
- (e) Habitat.

Nankeen Kestrel (*Falco cenchroides*):

Though migratory movements in birds of prey are well recognised in the U.S.A. and in Europe, I did not suspect a regular movement in any Australian species until 1936, at which time I had had a Kestrel's nesting site—a hollow spout in a dead Salmon Gum—under observation for three years at Nangeenan. In each of these years the Kestrels appeared about the middle of August (August 19, 1934; August 17, 1935, and August 13, 1936) and disappeared, after breeding, in the January of the year following.

When I returned to the wheat-belt, at Bilbarin, I saw no Kestrels until August 18, 1946. These birds were still present when I left, early in January, 1947, to reside at Caron.

My first record of the Kestrel at Caron was on August 17, 1947. Birds were noted at several localities during the ensuing months, but had disappeared when I returned from vacation in February, 1948. If one excepts two hawks, probably of this species, seen on March 27, no further Kestrels were seen until August 14, 1948, after which time records were fairly frequent and individuals were observed breeding.

The foregoing evidence points very definitely to a movement into the wheat-belt for the August-January period.

My only wheat-belt records outside of the August-January period were made at Totadgin, near Merredin, on July 27, 1935 and, as already mentioned, at Caron on March 27, 1948. I may, however, have failed to record "out-of-season" occurrences prior to 1946, because it was not until the end of my earlier residence in the wheat-belt that I suspected a definite movement.

On the coast Kestrels may be seen at all seasons, and I have autumn and winter records from coastal south-eastern Australia, the Riverina, the Nullarbor Plain, and the northern Goldfields.

I have no record of Kestrels drinking, and it seems unlikely that their movements are influenced by water supply.

Kestrels commonly breed in the wheat-belt.

Red-tailed Black Cockatoo (*Calyptrorhynchus banksii*):

Except when breeding, individuals of this species appear to be always on the move. I have made and analysed a large number of observations and find that the movement of these birds has a definite north-and-south direction. This does not mean a southerly movement followed some time later by a northerly movement; birds may be seen travelling in either direction at almost any time, but the line of flight is nearly always either northerly or southerly, and rarely in any other direction.

White-tailed Black Cockatoo (*Calyptrorhynchus baudinii*):

This species, like the foregoing, is a restless one, and birds encountered are usually on the move. My wheat-belt records are not, however, sufficiently numerous to enable me to draw any conclusions as to the nature of their movements.

I have observed birds of this species drinking.

Galah (*Kakatoe roseicapilla*):

At Nangeenan Galahs were seen only occasionally, and the same is true of the Dangin district. Appearances of Galahs in these districts are commonly attributed to dry conditions inland.

Galahs were, rather unexpectedly, encountered at Bilbarin in 1946.

At Caron, Galahs were always present, often in large flocks of up to two hundred birds. During August, September and October these large flocks break up, but many birds, possibly all, are still present, breeding in suitable localities.

The foregoing evidence is apparently contradictory. The obvious superficial conclusion is that Galahs at Caron are resident, whereas the Nangeenan evidence points to a movement following upon dry conditions elsewhere. At the same time, there is a suggestion that the species may be gradually extending its range in the South-west.

Smoker or Regent Parrot (*Polytelis anthopeplus*):

My records of this species show a decline in frequency from December (or even earlier) to March or April, the number present varying a good deal from year to year. This led me to suppose that these birds tended to leave the wheat-belt during the height of summer. However, at a time when the birds were absent from Nangeenan (January 1937) they were present near Dangin and again, when none was present at Caron (November 1947) the birds were reported as being fairly frequent seven miles away at Bunjil. Possibly water is the controlling factor. It seems likely that when adequate water is available the birds disperse widely, but that they fall back on to permanent water supplies when drier conditions prevail.

Port Lincoln Parrot (*Barnardius zonarius*):

The numbers of this species in any restricted area fluctuate a good deal, but I am inclined, nevertheless, to regard Port Lincoln Parrots as basically resident, their local distribution being governed by water supply. An expansion and contraction similar to that postulated for the Regent Parrot would explain this local movement.

My reason for considering this species resident is that the South-western population comprises several geographical races, or, more properly, a cline. The existence of these local variations appears indicative of a reasonably stationary population unless we assume that individuals return to their birthplace to breed—a regular movement, evidence of which is lacking.

Rainbow-bird (*Merops ornatus*):

This is perhaps the most consistent of all our migrants, flocks appearing in late September or early October and disappearing in late February or March.

Rainbow-birds breed freely in the wheat-belt.

They show some preference for lightly timbered areas.

Pallid Cuckoo (*Cuculus pallidus*):

Horsfield Bronze Cuckoo (*Chalcites basal*):

Black-eared Cuckoo (*Misocallius osculans*):

The cuckoos are, of course, among the most definite migrants. There is a tendency to regard larger migratory movements as a concession to seasonal variations in temperature, but how far is this true of the Australian cuckoos? In few parts of Australia is the winter climate so severe as directly to threaten the welfare

of a species. In evidence of this we have the fact that whereas the Pallid and the Bronze Cuckoos are summer visitors to south-eastern Australia, they are winter visitors to the South-west. It would seem that our Cuckoos escape the rigours of the South-western summer by moving northward—at a time when northern Australia is experiencing its hottest months! It seems hard, therefore, to believe that temperature is the controlling factor. As the Cuckoos visit the South-west during the wet season (winter) and depart at a time when the wet season is about to commence in northern Australia, rainfall appears more likely to be the controlling factor. However, if the controlling factor is rainfall only, these species might well be resident in the uniform rainfall areas of eastern Australia—except, of course, that a migratory movement is to be expected with the *Cuculidae*. My own observations suggest that the occurrence of Cuckoos in any area is related to the incidence of caterpillars—notably the hairy larvae to which Cuckoos seem particularly partial, and these appear to be most frequent, both in northern and in southern Australia, during the wet season when there is a strong growth of herbage. Two breeding seasons annually, one in the north and one in the south, appear probable.

At Nangeenan and at Caron, in the wheat-belt, Pallid Cuckoos appeared in late May, in June or even as late as August and departed in September or October. My earliest recorded arrival date in the wheat-belt is May 9 at Bilbarin in 1946. On the Peel Estate, a coastal locality, the cuckoos appeared in late May or June and remained until December. Juveniles were seen in January and February. This difference may be due to the heavier and better distributed rainfall of the coastal area. A similar difference is observable in the movement of the Horsfield Bronze Cuckoo.

The distribution and breeding season of parasitized species may also have some effect upon the occurrence of cuckoos. Our present knowledge of the Black-eared Cuckoo (*Misocalius osculans*) suggests that it would be likely to occur in the South-west only where Redthroat (*Pyrholaemus brunneus*) were reasonably frequent and this has been borne out by my experience: my only wheat-belt records were made during August and September 1947 and August 1948 at Caron, where Redthroat were abundant.

Bronze Cuckoos are usually present in the wheat-belt from June or July until November (adults) or December (juveniles).

Grey Fantail (*Rhipidura flabellifera*):

This species occurs sparingly in the wheat-belt from about May to September. My earliest wheat-belt record is April 18, 1948 at Caron, and my latest October 9, 1936 at Nangeenan.

I have observed individuals drinking and as they appear in the wheat-belt at a time when water is comparatively readily obtainable, it may be that the presence of water controls the movements of these birds.

I have no evidence of Grey Fantails breeding in the wheat-belt.

Black-faced Cuckoo-Shrike (*Coracina novæ hollandiæ*):

These birds may be encountered at any time, but generally speaking they are most frequent from July until December or January. In some years this influx is well marked.

I have not observed birds of this species drinking.

Cuckoo-shrikes breed freely in the wheat-belt from September until January.

White-winged Triller (*Lalage tricolor*):

The erratic occurrence of this species is well recognised: in some seasons the birds appear in considerable numbers though during a following season they may be completely absent.

Three well-marked irruptions and a number of odd records fall within the August-December period.

I have no record of Trillers drinking.

On a number of occasions I have noted Trillers feeding on caterpillars—sufficiently often to suggest that the birds have a marked preference for this type of food. It is possible that food supply is an important factor governing the movements of the species.

Breeding in the wheat-belt appears to be a common occurrence.

Western Warbler (*Gerygone fusca*):

At Nangeenan my records of this species were very infrequent and as in every instance they were based on call alone, I attach little importance to them.

Later experience at Dangin, Bilbarin and Caron, however, points to the bird being a winter visitor to the wheat-belt, appearing from April to September or early October. At Bilbarin, in 1946, Western Warblers were frequent from May to August.

At Northam, I found Western Warblers calling during January 1949. This suggests that lack of summer records is not due to birds remaining silent at that period, and that the bird is probably in the Northam district throughout the year.

I have not seen individuals drinking, but as moisture is usually easily obtainable during the period for which the birds are present, that is not significant.

I have no record of Western Warblers nesting in the wheat-belt.

This bird occurs almost exclusively in timbered areas.

Honeyeaters:

Honeyeaters are usually considered, with some justification, to be nomadic, but at least in the wheat-belt the movements of some species are sufficiently regular to be predicted with some certainty.

It seems probable that free water is essential to most honeyeaters and that their movements are largely governed by moisture requirements. I was at one time inclined to think that food was

a controlling factor of greater importance than water, but though this may be so, I am now inclined to doubt it. As the flowering of nectar-bearing plants usually follows upon a period of rainfall, it is not always easy to decide whether an influx of honeyeaters is due to a plentiful supply of nectar or whether it is an expansion movement permitted by humid conditions. Observation leads me to suspect that the latter is more often the case: the appearance of honeyeaters in an inland district often follows the establishment of moist conditions and not the flowering of nectar-bearing plants which comes later. Nevertheless, I have given some attention to the food plants of honeyeaters, especially at Caron, and will give further details in dealing with individual species. In each case where I have recorded a plant as a source of nectar I have actually seen individuals of the species apparently feeding from the flowers. I am indebted to Mr. C. A. Gardner (Government Botanist) for the identification of the plants concerned. The approximate flowering period of the plant is shown in brackets following upon the name.

Brown-headed Honeyeater (*Melithreptus brevirostris*):

This is one of the less predictable species. Most of my records fall within the March-September period, but there are a number of other records.

I have observed individuals drinking on many occasions.

Brown-headed Honeyeaters breed in the wheat-belt during the August-November period (Nangeenan and Caron).

I have not observed these birds to be closely associated with any particular flowering plant.

As this species is almost confined to the wheat-belt in Western Australia, no extensive movement is likely.

Tawny-crowned Honeyeater (*Gliciphila melanops*):

Birds of this species are often frequent on heathland during the April-October period (Nangeenan, Bilbarin, Caron) but are usually absent at other times. The birds may appear suddenly in force.

I have not seen individuals of this species drinking—I have, in fact, seldom seen them away from the waterless heathlands. On the other hand, moisture in the form of rain, dew, transpiration water and nectar would be fairly easily obtainable during the time at which the birds are present. I have observed Tawny-crowned Honeyeaters feeding on the flowers of *Grevillea erios-tachya* (September-February).

Some breeding at least takes place in the wheat-belt.

In my own experience the Tawny-crowned Honeyeater is almost exclusively a heathland species, but Mr. H. O. Webster's note (*Emu*, vol. 47, p. 63), on Tawny-crowned Honeyeaters in a thickly-forested area must be considered in postulating a movement for this species.

White-fronted Honeyeater (*Gliciphila albifrons*):

In many respects the movement of this species resembles that of the preceding species. White-fronted Honeyeaters are present on the heathland in numbers during the May-November period. Very occasionally birds are encountered at other times either on heath or in light forest.

I have seen birds of this species drinking, though, as in the case of the Tawny-crowned Honeyeater, supplies of moisture must be obtained from sources other than surface water in many localities.

I have observed this bird feeding on the flowers of *Hakea multilineata* (May-September), *Grevillea excelsior* (August-September), *Grevillea petrophiloides* (August-September), *Grevillea eriotachya* (September-February), *Calothamnus gilèsii* (November-December).

If one may judge from the large number of birds in immature plumage at the end of summer, many of these birds breed in the wheat-belt.

Brown Honeyeater (*Gliciphila indistincta*):

This species may be encountered at any time of the year near water or among nectar-bearing flowers, but, as might be expected from the foregoing, winter records are most common and I should say that the species is most likely to be encountered during the June-October period.

I have observed this species drinking, mainly during the summer months.

These birds have been noted associated with blossoming *Hakea multilineata* (May-September), *Grevillea petrophiloides* (August-September), *Grevillea paradoxa* (July-November), *Grevillea eriotachya* (September-February) and *Eucalyptus foecunda* (July-October).

This is a species with a wide range of habitat.

Singing Honeyeater (*Meliphaga virescens*):

Birds of this species are generally present throughout the year, but at Caron there was a marked local movement, the heathland population declining during the summer months. This decline coincided with a sharp rise (October to May) in the population on the railway dam catchment, a sparsely-timbered area where water was available after even light rains.

Singing Honeyeaters have been noted feeding on the flowers of *Grevillea excelsior* (August-September), *Grevillea eriotachya* (October), *Grevillea eriotachya* (September-February), *Grevillea paradoxa* (July-November), and *Grevillea petrophiloides* (August-September).

White-eared Honeyeater (*Meliphaga leucotis*):

A considerable irruption of individuals of this species at Nan-geenan has already been recorded, but generally speaking I have

not found this species frequent in the wheatbelt. Odd birds may be seen at all seasons, either in the open forest or among mallees on heathland.

White-eared Honeyeaters may often be seen drinking.

Grevillea criostachya (September-February) is the only flowering plant with which I have seen the species associated. I have no personal experience of this species breeding in the wheatbelt, but suspect that breeding is not uncommon.

Red Wattle-bird (*Anthochaera carunculata*):

Though odd birds may be encountered throughout the year, these birds are present in numbers only during the April-November period. A summer scarcity of individuals is also noticeable in the coastal districts near Perth, suggesting that the movement of the species is broadly north and south and not east and west.

On numerous occasions I have observed Wattle-birds drinking.

These birds have been noted feeding on the blossoms of *Hakea multilineata* (May-September), *Grevillea eriostachya* (September-February), and *Grevillea excelsior* (August-September).

Red Wattle-birds breed during September and October in the wheatbelt. Breeding may also be observed in coastal districts. Generally speaking this species appears only in eucalypt forests though it is not very exacting in its requirements and may be found where trees are scattered or are at low growth, e.g., among mallees on heathland and in trees growing in urban areas.

Observations made during 1948 are of interest and perhaps throw some light on the factors governing the movement of the species. The first rain of the season (excepting 10 points in January) comprised 55 points on March 17. Wattle-birds were seen for the first time on March 21, but these were confined to the railway dam catchment area. A week later Wattle-birds were still present in that area; one flock of ten was noted. Water was still available in the artificial catchment channels and in the course of half an hour's watching at one small pool I saw drinking Spiny-checked, White-eared, White-fronted, Singing and Brown-headed Honeyeaters, Wattle-birds and Mulga Parrots.

Fifteen points of rain fell on April 8, but this was insufficient to replenish pools of surface water, and, when I visited the catchment area on April 18, the channels were dry. No Wattle-birds were seen or heard, indeed no Honeyeaters other than Singing Honeyeaters were noted, and on April 25 only one call of a Wattle-bird was heard.

Further rain fell on April 30—this time 107 points—and when I again visited the catchment, on May 10, Wattle-birds were again plentiful and remained so throughout May. No rain fell during May, but the pools in the catchment channels persisted. After a light rain on June 4, Wattle-birds were observed away from the catchment area for the first time. Thereafter birds were often observed away from the railway dam, particularly in areas of

flowering Grevilleas. Birds disappeared from both dam and Grevilleas during late October. Perhaps it should be observed that the railway dam at Caron is covered and does not appear to be a source of water supply for most species of birds.

Summary

Species which appear to make a more or less regular seasonal movement:

Species	Present in Wheatbelt											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Nankeen Kestrel	x							x	x	x	x	x
Rainbow-bird	x	x	x							x	x	x
Pallid Cuckoo					x	x	x	x	x	x		
Horsfield Bronze Cuckoo						x	x	x	x	x	x	
Black-eared Cuckoo ...								x	x			
Grey Fantail					x	x	x	x	x			
Black-faced Cuckoo-shrike	x						x	x	x	x	x	x
White-winged Triller ...								x	x	x	x	x
Western Warbler				x	x	x	x	x	x			
Tawny-crowned Honeyeater				x	x	x	x	x	x	x		
White-faced Honeyeater					x	x	x	x	x	x	x	
Red Wattle-bird				x	x	x	x	x	x	x	x	

Species which appear to drift northwards and southwards at all seasons: Red-tailed Black Cockatoo, White-tailed Black Cockatoo.

Species which exhibit an "expansion and contraction" movement, ranging widely when water supplies are good and falling back upon permanent water during dry period: Galah, Regent Parrot, Port Lincoln Parrot, Singing Honeyeater.

Species with which a fairly regular movement is possible though reasonable proof of such movement is lacking: Brown-headed Honeyeater, Brown Honeyeater, White-eared Honeyeater.

It is suggested that the principal factor governing the movements of most of these birds is moisture and not food supply or temperature.